

THE MINERAL INDUSTRIES OF

THE ISLANDS OF THE CARIBBEAN

BARBADOS, CUBA, DOMINICAN REPUBLIC, JAMAICA, TRINIDAD AND TOBAGO, AND OTHERS

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BARBADOS

In 2002, mining continued to play a minor role in the economy of Barbados. The principal mineral commodities produced in the country were natural gas and petroleum. Industrial mineral production included cement, clays, limestone, and sand. Barbados' estimated gross domestic product (GDP) based on purchasing power parity was \$4 billion in 2002. Population was estimated to be about 277,000 (U.S. Central Intelligence Agency, 2002§,¹ 2003§).

The Ministry of Environment, Energy, and Natural Resources is the Government agency responsible for the mining sector of Barbados. The country's energy companies were Barbados National Oil Company Ltd., which produced liquid petroleum gas, natural gas, and petroleum, and National Petroleum Corporation, which was responsible for distributing and selling natural gas.

In 2002, production of petroleum decreased by about 15.7% to 391,000 barrels. Barbados had no refining capacity. Crude petroleum was shipped to Trinidad and Tobago for refining and then shipped back as refined petroleum products for domestic consumption. Barbados also was a party to the Caracas Energy Accord and the San Jose Pact under which Mexico and Venezuela supplied petroleum and refined products to various Caribbean and Central American countries under beneficial terms (U.S. Energy Information Administration, 2003§). Natural gas production decreased by 10.3% to 29 million cubic meters.

Cement production increased by about 19.3% in 2002 to 297,667 metric tons (t). Arawak Cement Company Limited [a wholly owned subsidiary of Trinidad Cement Limited (TCL)] was the sole cement manufacturer. Cemex, S.A. de C.V. of Mexico held a 20% interest in TCL. New infrastructure projects in 2002 included the rehabilitation of the Hilton Hotel, the redevelopment of the Grantley Adams International Airport, the renovation of the Town Hall in Bridgetown, and the construction of a Coastal Defense Unit in Speightstown (Central Bank of Barbados, 2003, p. 5).

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CUBA

In 2002, Cuba's estimated GDP based on purchasing power parity was \$25.9 billion. Exports, which consisted of citrus, coffee, fish, medical products, nickel, sugar, and tobacco, were valued at \$1.8 billion free on board (f.o.b.). Economic growth in 2002 was hindered by high petroleum import prices, recessions in key export markets, damage from Hurricanes Isidore and Lili, and the slowdown in tourism following the events of September 11, 2001, in the United States (U.S. Central Intelligence Agency, 2003§). The metals produced in the country were chromite, cobalt, copper, gold, iron and steel, and nickel. Industrial minerals produced included cement, clays, crushed stone, feldspar, salt, and silica sand. Nickel was the second largest source of foreign exchange. Cuba was among the world's top 10 producers of nickel in 2002. Population was estimated to be about 11.2 million (U.S. Central Intelligence Agency, 2002§, 2003§).

Mining activity in Cuba is regulated by law No. 76. Under the law, the Government is the sole owner of the subsoil, mines, and all mineral resources. The minerals sector is administered by three government entities—the Ministerio de la Construcción, the Ministerio de la Industria Básica, and the Oficina Nacional de Recursos Minerales. Clay, marble, and other construction material sectors report to the Ministerio de la Construcción. The Ministerio de la Industria Básica is responsible for energy, geology, and

¹ References that include a section mark (§) are found in the Internet References Cited sections.

mining. Mineral concessions are awarded by the Oficina Nacional de Recursos Minerales, which was created in 1995; it is also charged with protecting Cuba's mineral and hydrocarbon resources, controlling mineral production, and ensuring the preservation of the environment in mining areas. Geology and mining are overseen by the Government-owned companies Unión del Níquel S.A. and Unión Geológica Minera S.A. (Geominera). Unión del Níquel is responsible for the production and processing of cobalt and nickel. The company works independently and in joint ventures with private companies to produce nickel from three active mines in eastern Cuba. Geominera is responsible for the exploration and production of all metallic and nonmetallic minerals, except nickel, and participates in joint-venture projects with foreign private companies.

In the energy sector, Government-owned Cubapetróleo S.A. (CUPET) is responsible for exploring, refining, and marketing petroleum. More than 70,000 square kilometers onshore and 70,000 square kilometers offshore were opened for prospecting and exploration in 2002 (Government of the Republic of Cuba, 2003§).

Foreign investment is regulated by law No. 77. Companies interested in investing in Cuba must contact the Ministry for Foreign Investment and Economic Cooperation (MINVEC) and hire the services of a Cuban-based consulting firm that will contact other related ministries and business groups. A Letter of Intent or Framework Agreement must be signed by all interested parties. All legal documentation is then submitted to MINVEC for a preliminary evaluation of the proposed project. The Executive Committee of the Council of Ministers is the ultimate authority to approve or deny the proposed investment project. Under Decree 206-96, foreign business corporations and individual investors can establish a branch office in the country by obtaining a license from the National Registry of Foreign Branch Offices and Business Corporation Agents (Investment Promotion Center of the Ministry for Foreign Investment and Economic Cooperation, 2003§).

In 2002, foreign investment efforts were focused on the search for capital, competitive technologies, and new markets. Agreements on promotion and reciprocal protection of investments were signed between Cuba and 54 countries; seven other agreements for avoidance of double taxation also were signed. Cuba's principal trading partners were France, Germany, Italy, Russia, and Spain in Europe and accounted for 47% of Cuba's total commercial exchange; Canada, Mexico, the Netherlands Antilles, and Venezuela in America, accounted for 37%; and Asia, 14% (Investment Promotion Center of the Ministry for Foreign Investment and Economic Cooperation, 2003§).

As of March 2002, the number of joint ventures and economic associations that were operating with foreign capital in Cuba was 403. These associations were in 32 sectors, which included agriculture, mining, petroleum, product assembly, and tourism. Direct foreign investment in Cuba was \$38.9 million in 2001 (U.S.-Cuba Trade and Economic Council Inc., 2003§).

In September 2002, Newport Exploration Ltd. of Canada entered into an option agreement with Northern Orion Explorations Ltd. of Canada to acquire a 50% interest in the Mantua copper project located in western Cuba. Geominera held the remaining 50% (Caribbean Update, 2002a).

Mineral production continued to be dominated by the Government-owned companies. Production of nickel (nickel content of nickel oxide, nickel-cobalt sulfide, and nickel-cobalt ammonium liquor) was 71,592 t in 2002. Production of nickel and cobalt came from three operations, two of which produced nickel oxide and one that produced the intermediate product, nickel-cobalt sulfide. Moa S.A. was a mining and processing operation that was part of a vertically integrated joint-venture company formed in 1994 between the Government of Cuba (50%) and Sherritt International Corp. of Canada (50%). Production from the Moa operation was 33,382 t of nickel-cobalt mixed sulfide, which was about 1,020 t more than that of 2001. The mixed sulfides produced at Moa were shipped to Canada and then transported by rail to Sherritt's refinery at Fort Saskatchewan, Alberta, Canada, to produce nickel metal and cobalt (Sherritt International Corp., 2003, p. 20-21). Production of nickel oxide totaled 39,516 t. Nickel produced from ammonium liquor totaled about 1,218 t of nickel. Nickel oxide and sinter were produced by the Government from two other operations in Punta Gorda and Nicaro, Province of Holguín.

Cuba had 246 quarries that produced construction aggregates, 32 quarries that produced marble, and 6 cement plants that had a combined total clinker capacity of 5.4 million metric tons (Mt). The six cement plants were Antemisa, Cienfuegos, Mariel, Nuevitas, Santiago, and Siganey. Most of the country's new heavy construction equipment was imported from Asia (U.S.-Cuba Trade and Economic Council Inc., 2003§).

Production of petroleum, which continued to increase in 2002, reached 22.8 million barrels (Mbbbl) (reported as 3,533,400 t), and natural gas production reached 584,700 thousand cubic meters (table 1). Most domestic petroleum consists of a heavy-sulfur-laden oil. Petroleum was also imported from Mexico and Venezuela and refined in Cuba to meet domestic demand. About one-third of the country's crude oil and refined products demand was provided by Venezuela. The shipments from Venezuela, which were 53,000 barrels per day (bbl/d), were suspended in April following an unsettled political situation in Venezuela. The special financial agreement that allowed Venezuela to sell petroleum to Cuba under preferential conditions was set to expire in 2005. The terms of the agreement included a 15-year repayment period, a 2-year grace period, and a 2% interest rate. Shipments of petroleum to Cuba were resumed in September (Caribbean Update, 2002b, c; U.S. Energy Information Administration, 2003§).

Petroleum production in Cuba was sold to the Government at prices based on an international reference price for fuel oil of comparable quality. Sherritt was the largest producer of petroleum in the country. Sherritt's oil production in Cuba increased by 27% to 38,256 bbl/d from an average of 30,079 bbl/d in 2001 as a result of additional output from new wells in the Canasi, the Puerto Escondido, and the Yumuri fields. In 2002, the company acquired the exclusive exploration rights on four blocks in the deepwater Exclusive Economic Zone off the northern coast of Cuba. Sherritt held 10 exploration production-sharing contracts in Cuba (Sherritt International Corp., 2003, p. 22-25).

Sherritt drilled 13 development wells and 3 exploration wells in 2002. All development wells were successful and contributed to overall production. One of the exploration wells failed to produce at economic rates, and the other two were suspended after failing to

encounter the expected reservoir (Sherritt International Corp., 2003, p. 25). Pebercan Inc. of Canada announced in February the completion of its CANASI 5 production well in Cuba's onshore block 7. The average production of the well was 3,500 bbl/d, which increased gross production in block 7 to about 13,000 bbl/d in 2002 (Pebercan Inc., 2002).

The commissioning of Sherritt Power Corporation's combined-cycle phase of the Varadero project, which was expected to supply an additional 75 megawatts (MW) of net power capacity, began in late 2002. Once completed, the facility was expected to increase Sherritt Power's net power capacity to 226 MW, which would represent about 10% of Cuba's electricity requirements. Once fully onstream, the facilities at Varadero were expected to produce low-cost power by using associated natural gas from Cuba's petroleum fields. Natural gas liquids and sulfur from the gas stream were expected to be recovered. As of December 31, 2002, Sherritt held a 49.7% interest in Sherritt Power (Sherritt International Corp., 2003, p. 27).

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DOMINICAN REPUBLIC

In 2002, the Dominican Republic remained a regional producer of cement, ferronickel, gypsum, salt, and steel. Limestone, marble, and sand and gravel were also produced solely for domestic consumption (table 1). Amber, larimar (pectolite), and limestone was produced in modest amounts by six small artisanal mining associations. During the year, growth in economic activity measured by real GDP was 4.1%, which was the second highest in the Caribbean region. Total mineral production, however, decreased by 2.7% principally as a consequence of the decrease in the production of limestone and rock salt. Production of nickel, which was the country's most important mineral to the economy, increased by 1.9%, and production of marble and gypsum increased by about 16.8% and 1.9%, respectively. Production of construction aggregates, such as sand and gravel, increased by 3.2%. Rock salt production, however, plummeted owing to the closing of operations of the country's principal producer Vamincor Dominicana S.A. (Banco Central de la República Dominicana, 2003, p. 1, 5-6). The country's estimated GDP based on purchasing power parity was \$53 billion in 2002. Exports, which mainly consisted of cocoa, coffee, ferronickel, meat, sugar, and tobacco, were valued at \$5.3 billion f.o.b. Population was estimated to be about 8.7 million in 2002 (U.S. Central Intelligence Agency, 2002§, 2003§).

Law No. 146 of 1971 regulates mining activities in the country. The entity responsible for supervising the sector is the General Mining Office of the Ministry of Industry and Trade. Under the mining law, concessions are limited to an area of 20,000 hectares, foreign companies must establish legal domicile in the country by appointing a legal representative, and foreign governments cannot obtain concessions. In addition to the provisions of the Tax Code, mining activities require the purchase of a mining business patent, which is issued by the Ministry of Industry and Trade. Before 2000, natural resources in the Dominican Republic were not effectively protected. Law No. 64-00 regulates air pollution, domestic and municipal waste, elements and substances, hazardous products, and soil and water contamination. It also regulates the granting of rights by the Ministry of Environment and Natural Resources and/or municipal authorities for the use of natural resources, which included caves, coastal and sea resources, forests, minerals, soil, and water. The Ministry of Environment and Natural Resources is responsible for the administration of the ecosystems, the environment, and the natural resources (European Commerce Chambers—Federation of the Dominican Republic, 2001§).

Mineral production in the Dominican Republic was by the Government and the private sector. Production of gold and silver was suspended in 1999 and had not resumed in 2002 (table 1). The country's sole producer of gold and silver had been Government-owned Rosario Dominicana S.A., which remained idle. Rosario Dominicana was established in 1975 to operate the Pueblo Viejo gold and silver mine. The mine had an original output capacity of about 12,400 kilograms per year (reported as 400,000 troy ounces). The company's estimated export earnings from 1975 to 1998 were about \$2.0 billion (Rafael Osiris de León, Secretary, Academy of Sciences of the Dominican Republic, written commun., July 2002). In July 2001, Placer Dome Inc. of Canada was awarded the right to negotiate an agreement to operate the Pueblo Viejo Mine. In August 2002, following the ratification of a Special Lease Agreement by the Congress of the Dominican Republic, the company launched a feasibility study at Pueblo Viejo. Under the terms of the agreement, the Dominican Republic would receive a combination of a net smelter return, a net profits interest, and corporate taxes based on varying profit levels. The Dominican Republic will remain responsible for any environmental liabilities prior to Placer

Dome's operations. Placer Dome's allowed timeframe to reach a production decision was 4 years. The expected life of the mine was 33 years (Placer Dome Inc., 2002).

In April, TGW Corporation of Canada announced the acquisition of the Cerro de Maimon massive sulfide deposit from Falconbridge Ltd. Through its subsidiary Compañía Minera Dominicana, the company paid an initial \$350,000 subject to a 2% royalty on closing and agreed to make payments of \$250,000 12 months after the completion of a viable feasibility study and \$250,000 12 months after production begins and to acquire 1% of the royalty for \$1 million at any time. The deposit was discovered by Falconbridge in 1978 and is located within block C-1 of the Quisqueya mining concession. The deposit consisted of about 3.3 Mt with 3.93% copper, 1.93% zinc, 47.32 grams per metric ton (g/t) silver, 0.56 g/t gold at 1% copper cutoff rate (TGW Corporation, 2002).

Production of nickel in ferronickel decreased by about 2.9% to 23,300 t compared with a revised production of about 24,000 t in 2001. Nickel was produced by Falconbridge Dominicana C. por A. (Falcondo). The company was a subsidiary of Falconbridge Ltd. of Canada (85.26%), which was the only nickel producer in the country; the remaining equity was owned by Redstone Resources Inc. (4.1%) and the Government of the Dominican Republic (10.64%). Falcondo mined, milled, smelted, and refined its own nickel laterite ores at the company's ferronickel plant in Bonao. The company cited that the reduction in production was largely a result of planned shutdowns and that planned production was expected to return to a rate of 27,000 t in 2003. As of December 31, 2002, total proven and probable reserves at Falcondo were estimated to be 64.1 Mt (Falconbridge Ltd., 2003, p. 21). Falcondo's production capacity was 30,000 metric tons per year of nickel contained in ferronickel. The company comprised seven surface-mining areas in Caribe, Fraser, Guardarraya, Larga, Ortega, Peguera, and Taína. The facilities included a metallurgical treatment plant, a crude oil processor, and a 200-MW thermal powerplant.

In 2002, production of gypsum was 178,941 t. Gypsum reserves in the Dominican Republic were estimated to be about 800 Mt (Dirección General de Minería, 2002, p. 13). Production of limestone was 429,000 t. Chalk, coquina, and other types of limestone used in the construction sector were mined at Pedernales and Polo in the Province of Barahona and at El Pomier in the Province of San Cristóbal. Limestone production was used domestically for the manufacturing of calcium carbonate, hydrated lime, and quicklime aggregates for the construction industry. Production of marble increased by 16.8% to about 6,300 cubic meters compared with 5,400 cubic meters in 2001 (Banco Central de la República Dominicana, 2003, p. 5). Marble reserves in the Dominican Republic were estimated to be about 300 million cubic meters (Dirección General de Minería, 2002, p. 12). The most significant deposits in the country were located in the Samaná Peninsula; other deposits have been identified in the Provinces of El Ceibo, Hato Mayor, La Vega, Puerto Plata, Sánchez Ramírez, and Santiago.

In the Dominican Republic, amber was mined by rudimentary methods in the communities of El Valle, which are located in the Provinces of Hato Mayor, Puerto Plata, and Santiago, and in the communities of La Cumbre, Los Cacaos, and Palo Alto. Pectolite, which was marketed in the Dominican Republic under the name of larimar, was produced by a cooperative of artisanal miners in the city of Barahona. Alabaster, onyx, and travertine deposits were known to exist near Canoa and Vicente Noble in the Province of Barahona.

In 2002, the Dominican Republic did not produce petroleum. The country imported petroleum and refined products from Mexico and Venezuela under the terms of the San Jose Pact. During the year, Murfin Dominicana Inc. of the United States continued to explore for petroleum and gas on its 1.1-million-hectare onshore concession in the southern part of the country. The concession encompassed the Azua and San Pedro Basins (Oil & Gas Journal, 2002).

Liquefied natural gas (LNG) was imported from Trinidad and Tobago for power generation. The country's total petroleum refining capacity in 2002 was 48,300 bbl/d. Petroleum was refined at Bonao by Falcondo (16,000 bbl/d) and at Haina by Refinería Dominicana de Petróleo (32,000 bbl/d). In 2002, Petróleos de Venezuela S.A. was studying the possibility of building two new refineries in the Dominican Republic (U.S. Energy Information Administration, 2003§).

Constant power outages were still affecting the Dominican Republic in 2002. Although the Government had privatized parts of Corporación Dominicana de Electricidad (CDE) in 1999, Unión Fenosa of Spain and AES Gener S.A. (AES) of Chile, which were the companies that bought into the distribution network, stopped supplying electricity in 2002; they cited the Government's inability to pay. Despite the situation, foreign firms continued to invest in the country's power infrastructure. AES Andres BV (a subsidiary of AES) invested \$400 million to construct an LNG import terminal, a regasification facility, a pipeline, and a 300-MW combined-cycle powerplant, which is located outside of Santo Domingo. The Dominican Republic produced 700,000 kilowatt-hours (kWh) of hydroelectricity and was the leading producer in the Caribbean (U.S. Energy Information Administration, 2003§).

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Major Sources of Information

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JAMAICA

In 2002, Jamaica ranked among the world's leading producers of bauxite and alumina. The bauxite and alumina industry's levels of output increased by 6.1% and 2.5%, respectively; these are the highest levels since 1974. The country also produced cement, gold, gypsum, lime, limestone, refined petroleum products, salt, and other construction materials (table 1). Despite setbacks, which affected many sectors of the economy, the output of the mining and quarrying sector increased by 3.4% compared with that of 2001. The construction and installation sector also registered a 2.2% increase in output (Planning Institute of Jamaica, 2003§). Jamaica's estimated GDP based on purchasing power parity was \$10 billion in 2002. Exports, which consisted mainly of alumina, bananas, bauxite, rum, and sugar, were valued at \$1.4 billion f.o.b. Population was estimated to be about 2.7 million (U.S. Central Intelligence Agency, 2002§, 2003§).

The Ministry of Mines and Energy is the Government agency responsible for the mining sector in Jamaica. Legislation that governs the mineral sector includes the Mining Act, Mining Regulations, the Minerals (Vesting) Act, Mines and Health Regulations, the Bauxite and Alumina Encouragement Act, the Quarries Control Act, Quarries Regulation, and the Gunpowder and Explosives Act. The Mines and Geology Division supports the Ministry through research and ensures compliance with the mining laws. The Jamaica Bauxite Institute (JBI) is responsible for monitoring and regulating the bauxite industry and serves as the Government's advisor in all matters that concern the industry. The Bauxite and Alumina Encouragement Act provides for a waiver of duties on capital expenditures, among others. In addition, a provision under the Bauxite and Alumina Industries Special Provision Act encourages incentive-based agreements between the Government and bauxite/alumina producers. Incentives given consist of an up-to 10-year tax holiday, no custom duties on capital goods, and no withholding tax on dividends. An income tax of 33.3% of all profits on mining companies, with the exception of bauxite companies, is assessed under the Income Tax Act (Mines and Geology Division of Jamaica, 2001§).

The JBI, which was established in 1976 as an arm of Jamaica National Investment to deal with the Government's participation in the industry, regulates and monitors the operations of the bauxite industry. The Institute's functions include monitoring and studying the aluminum industry, providing technical advice, undertaking research and development activities, assessing and insuring rationalization in the use of bauxite reserves and land, and monitoring and making recommendations on pollution control and other environmental concerns in the industry. The JBI also manages the Bauxite Community Development Program, which implements development projects within the vicinity of bauxite and alumina operations (Ministry of Finance and Planning, 2003, p. 4-5).

In April 2002, Alcoa World Alumina and Chemicals (AWAC) signed an agreement with the Government of Jamaica to invest \$115 million to expand the Alcoa Minerals of Jamaica, Inc. (Jamalco) alumina refinery. The expansion and modernization of the plant are the result of Alcoa's interest in benefiting from the new tax system established by the Government. The new tax system provides an incentive to companies committed to expanding capacity and modernizing their plants to replace the old bauxite levy, which established taxation on bauxite production, with a new system that establishes taxation on profits. The new tax system will be negotiated company by company. Jamalco's expansion has been scheduled for 2003. The expansion will increase Jamalco's alumina refining capacity by 25% to about 1.25 million metric tons per year (Mt/yr). AWAC was a joint venture between Alcoa Inc. of the United States (60%) and Alumina Ltd. of Australia (40%). Jamalco was a partnership between AWAC (50%) and the Government of Jamaica (50%) (Alcoa Inc., 2002; Metal Bulletin, 2002). Negotiations between the Government and other producers, such as Kaiser Aluminum Corp. and Glencore International AG, to secure the removal of the levy from their operations were expected to follow (Caribbean Update, 2002a).

Minerals were produced by the Government and the private sector. Bauxite and alumina output increased despite disruptions in the sector caused by flood rains in May, June, and September, industrial unrest, and technical problems at one of the plants. The Planning Institute of Jamaica attributed the increase in production to lower aluminum prices. In 2002, bauxite and alumina production was 13.1 Mt and 3.6 Mt, respectively, which was an annual increase of 6.1% and 2.5%, respectively. Total export earnings from the sector, however, declined as a result of lower aluminum prices. The Government expected further production improvements in anticipation of bauxite output reaching 13.5 Mt and alumina output reaching 3.85 Mt in 2003 (Planning Institute of Jamaica, 2003§).

Bauxite mined by Kaiser Jamaica Bauxite Company and Alumina Partners of Jamaica was shipped to the Grammercy plant in Louisiana. Although bauxite deposits in Jamaica lie relatively close to the surface, they occur in scattered pockets across the country's rugged terrain. Jamaica is divided into about 600,000 parcels, and title searches and secure legal conveyance for bauxite-bearing land is often difficult (ARC News, 2002/2003). In 2002, Kaiser had fully developed and implemented a geographic information system (GIS) to support exploration and property acquisitions in Jamaica; the company had begun to develop the needed data infrastructure in the early 1990s. The use of ground-penetrating radar integrated with GIS applications has allowed for rapid field collection and subsurface characterization of bauxite deposits in Jamaica and for producing accurate volumetric estimates and supporting exploration drilling efforts in the country (Mining Engineering, 2002).

In 2002, West Indies Alumina Company (Winalco) announced the divestment of its Kirkvine mining operations to Henry Walker Eltin Group Ltd. of Australia; Winalco was a joint venture between Glencore (93%) and the Government of Jamaica (7%). The contract involved the provision of mining and cable belt operation of the Kirkvine bauxite and alumina complex, and the operation of a nearby limestone quarry. In addition, the company will be responsible for the construction of a 7.8-kilometer cable-belt conveyor. Kirkvine was the third mining operation contracted to Henry Walker Eltin in Jamaica. Other contracts involved mining, rehabilitation, and conveyor transport services to Aluminum Partners and mining and rail loading operations for Jamalco (Henry Walker Eltin Group Ltd., 2003).

Jamaica produced about 328 kilograms (kg) of gold and 174 kg of silver in 2002. Gold and silver were produced at the Pennants gold mine in Clarendon Parish. Production of aggregates was approximately 11.7 Mt (table 1). The three most widely used aggregates were marl-fill (5.7 Mt), limestone (3.5 Mt), and sand and gravel (2.2 Mt).

In 2002, Jamaica depended on imported petroleum for most of its energy needs. Petroleum and refined products were imported from Ecuador, Mexico, and Venezuela. Ownership of the petroleum industry was shared by the Government and the private sector. Petroleum Corporation of Jamaica (PCJ), which was a statutory corporation under the Ministry of Mining and Energy, had the exclusive right to explore for oil, to develop petroleum resources, to negotiate import contracts, to operate refineries, and to sell petroleum and petroleum products in Jamaica. PCJ's subsidiaries included Petrojam, which operated the only petroleum refinery in the country, and Petcom Limited, which was a marketing and retailing company. Petrojam processed crude oil into such finished products as asphalt, auto diesel oil, heavy fuel oil, liquefied petroleum gas (LPG), turbo fuel, and unleaded gasoline. The refinery was expected to produce 63% of its finished refined petroleum products requirements and would import the remaining 37%. The majority

of finished products was imported from Petroleum Co. of Trinidad and Tobago (Petrotrin). Petcom operated the Portmore service station and LPG filling plants in the country (Ministry of Finance and Planning, 2003, p. 16-17).

The Government, through the Jamaican Public Service Company (JPSCo), which was the country's main power provider, generated, transmitted, and distributed most of the electric power in Jamaica. Jamaica's installed power capacity, which included that of independent producers, was 700 MW in 2002. Mirant Corporation of the United States, which acquired 80% of JPSCo in 2001, planned to add an additional 385 MW of generating capacity to the system by 2003 (U.S. Energy Information Administration, 2003§). In 2002, Jamaica was considering importing LNG from Trinidad for electricity generation. The bauxite and alumina industry alone accounted for about 40% of all energy consumption in Jamaica. The country would need to build the appropriate infrastructure, which would include a regasification plant and pipeline, to begin importing LNG from Trinidad (Petroleum Economist, 2002). Jamaica applied for a technical assistance grant from the Caribbean Development Bank to support regulation of the electricity industry (Caribbean Update, 2002b).

In February, TransJamaican Highway Ltd. received \$50 million for the first phase of the Highway 2000 project; TransJamaican Highway was the local subsidiary of French company Entreprise Francis Bouygues, which was awarded the Highway 2000 project in 2001. TransJamaican Highway will operate the toll roads during the 35-year concession period. In its first phase, the four-lane highway will run between Kingston and Williamsfield, Manchester Parish. The cost of the project was estimated to be \$390 million (Caribbean Update, 2002c).

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TRINIDAD AND TOBAGO

In 2002, the leading industries in Trinidad and Tobago were chemicals, natural gas, petroleum, and tourism. The country's real GDP increased by 3.2% during the year following a trend of 9 consecutive years of economic growth that began in 1994. The energy sector, which was one of the major contributors to this growth, accounted for more than 70% of the country's foreign exchange earnings and 25% of the GDP. Production of petroleum increased by about 15% owing to increased condensate output associated with an increase in natural gas production. Refinery output decreased by about 2.1% largely as a result of disruptions in supply from Venezuela. The construction sector grew by 5% owing mainly to the developments in the energy sector and to the Government's public sector investment program (Central Bank of Trinidad and Tobago, 2003, p. 4-6).

Besides petroleum, Trinidad and Tobago also produced andesite, argillite, asphalt, cement, clays, direct-reduced iron (DRI), limestone, natural gas liquids (NGL), plastering sands, porcellanite, quartzitic sand and gravel, and tar sands. The country's GDP based on purchasing power parity was estimated to be \$11.1 billion. Exports, which mainly consisted of chemicals, citrus, cocoa, coffee, fertilizers, flowers, and petroleum and petroleum products, were valued at \$4.2 billion f.o.b. Population was estimated to be about 1.2 million (U.S. Central Intelligence Agency, 2002§, 2003§).

The Ministry of Energy and Energy Industries was the Government agency responsible for the management and development of the petroleum and mineral resources of Trinidad and Tobago. The Ministry's major functions were the leasing and licensing of areas for petroleum exploration and production, the regulation and management of all oil and gas activities, and the administration of domestic marketing of petroleum products, natural gas transmission and sales, petrochemical manufacture, and other natural-gas-based industries. The Ministry was also responsible for the formulation and implementation of legal instruments for the petroleum industry and for the administration and management of the minerals sector. It shared responsibilities with the Ministry of Finance for the collection of petroleum revenues accruing to the State (Ministry of Energy and Energy Industries, 2002§).

In 2002, the Government implemented new energy policies to attract investors. The policies included the establishment of a standing committee on energy to represent all energy stakeholders' interests, the development of a Natural Gas Master Plan to diversify the country's gas-based economic portfolio, and the sustainability of gas development. Under consideration was a review of fiscal incentives and tax policies with regard to ammonia and methanol, a review of the oil and gas tax regime, the reprioritization of goals in the gas sector, the expansion of LNG exports, the development of new sites for industrial estates, the consideration of direct sales of natural gas to consumers, and the negotiation with major producers over royalty issues (Oil & Gas Journal, 2002b).

Mineral commodities in Trinidad and Tobago were produced by the Government and the private sector. The Government continued to focus its efforts on attracting foreign direct investment in the country's petroleum and energy sectors. In 2002, BG Group announced its interest in exploring and developing the gasfields in the Plataforma Deltana area near the Venezuelan border. BG planned to develop the reserves on both sides of the border upon approval of the Trinidadian and the Venezuelan Governments (Central Bank of Trinidad and Tobago, 2003, p. 4). BHP Billiton began an appraisal-drilling program on block 2c offshore Trinidad and Tobago in January 2002. In March, the well tested 4,360 bbl/d of petroleum (BHP Billiton, 2002). The company had previously drilled four exploration wells on the block—the Angostura I in 1999 and the Aripo I in 2000, which tested about 850,000 cubic meters per day (reported as 30 million cubic feet per day) and about 612,000 cubic meters per day (reported as 21.6 million cubic feet per day) of natural gas, respectively, and the Kairi I and Canteen I in 2001, which tested 3,000 bbl/d and 3,660 bbl/d of crude petroleum, respectively. BHP Billiton held a 45% interest in the block, TotalFinaElf S.A. of France held 30%, and Talisman Energy Inc. of Canada held the remaining 25%. BHP (50%) and Talisman (50%) also held interest in block 2ab. BHP (30%), BP Group (30%), Talisman (30%), and TotalFinaElf (10%) held interests in block 3a (Business News Americas, 2002§).

In January, American Manor Enterprises Inc. of Canada signed a Letter of Intent with Jasmine Oil and Gas to earn an 80% interest in the South Erin block by completing the drilling of two wells. Another Letter of Intent was signed by the company in February with Moonsie Oil and Gas Ltd. to earn a 75% interest in the Palo Seco block 4 upon completion of two wells by August 31. Moonsie Oil and Gas was an independent oil producer in Trinidad (American Manor Enterprises Inc., 2002).

In March, Venture Production of the United Kingdom, in joint venture with Government-owned Petrotin, began a seven-well drilling program in Trinidad's Gulf of Paria. The project included five exploratory wells and two development wells. Venture Production held a 55% working interest in the Brighton-Guapo Bay Marine block; Petrotin held the remaining 45%. A joint venture among Petrotin (50%), Venture Production plc (42.5%), and Krishna Persad (7.5%) had three other exploratory wells scheduled for drilling in the Point Ligoure block in 2002 (Oil and Gas International, 2002§).

Production of ammonia increased by 7.3% to about 3.26 Mt in 2002. The increase in output was attributed to expanded capacity at the Caribbean Nitrogen Company, which had increased its total number of ammonia plants to nine. Steel was produced by an integrated minimill owned by Caribbean Ispat Limited (a subsidiary of Ispat International N.V.). Production of DRI was 2.3 Mt, which was a 5.9% increase compared with that of 2001. Production of billets, crude steel, and wire rods also increased in 2002.

Production of petroleum in Trinidad and Tobago was by Petrotin and by the private sector. Petrotin had the largest acreage position under active exploitation in the country and controlled the southern half of Trinidad and Tobago's acreage off the southern, southeastern, southwestern, and northern coasts. The company operated these properties alone or jointly with 14 lease operators, 8 farmout operators, and 8 joint-venture partners. The lease program was introduced in 1989 as an attempt to reactivate idle wells. Under this program, contractors sublease small blocks and can earn revenue from sales of crude oil from workovers or replacement wells, and Petrotin books the reserves, collects an override and a user fee, and sells the crude oil to the refinery. The farmout program, which was launched in 1991, involves leasing all the acreage in a block. The operator receives a royalty and gets unlimited rights to the block and commits to a work program that includes seismic surveys, exploration and development drilling, workovers, and deployment of appropriate technology. In addition, Petrotin owned joint-venture interests in deepwater blocks 25 and 27 and a unitized gas interest off the northern coast of the country. In 2002, production of crude petroleum was about 47.7 Mbbl, which was an increase of about 15.3% compared with that of 2001 (table 1). The increase in production was attributed to a surge in condensate output associated with higher natural gas production (Oil & Gas Journal, 2002a, b).

Petrotin also operated the country's sole refinery at Point-a-Pierre. The refinery's capacity was 160,000 bbl/d. About 20,000 bbl/d of crude was received from Petrotin's own fields; 34,000 bbl/d, from its Trinmar subsidiary in the Gulf of Paria; 6,000 bbl/d, from small local and foreign operators; and 4,000 bbl/d, from existing lease operators. These sources accounted for about 40% of refinery capacity (Petroleum Economist, 2002). The remaining crude was imported from Brazil, Ecuador, Venezuela, and West Africa. About 85% of Point-a-Pierre's refinery products were exported, and the remaining 15% were consumed domestically (Oil & Gas Journal, 2002a). In 2002, Point-a-Pierre's refinery output declined by about 4.6% to 53.4 Mbbl.

In the early 1970s, the Government of Trinidad and Tobago regarded crude petroleum as the dominant resource in the country. Consequently, Government efforts were focused on how to use the country's surplus revenues from petroleum exports and refined products to develop a world-class port facility and industrial estate at Point Lisas. The National Gas Company of Trinidad and Tobago was created in 1975 to oversee the purchase and sale of natural gas in the country. As the country's natural gas endowment

grew and gross national revenues from the petroleum sector began to decline, the Government refocused its efforts on the exploration and development of natural gas. Trinidad was the world's leading exporter of ammonia and methanol in 2002 (Oil & Gas Journal, 2002b).

Production of natural gas increased by 15.5% to about 19.2 billion cubic meters in 2002 from 16.6 billion cubic meters in 2001 (table 1). The major users of natural gas in the country were Atlantic LNG Company of Trinidad and Tobago (47%), ammonia plants (23.4%), methanol companies (14.5%), and power-generating companies (11.6%). The Ministry of Energy projected that natural gas reserves would last about 18 years given the country's then usage rate. Trinidad's natural gas reserves were estimated to be about 650 billion cubic meters (reported as 23 trillion cubic feet). The Government was debating whether additional LNG trains or new downstream industries should be developed in the country but announced its intention of attracting additional investments in petroleum and gas exploration (Central Bank of Trinidad and Tobago, 2003, p. 5).

Construction work continued on Atlantic LNG's Train 3. Atlantic LNG was a joint venture among the National Gas Company of Trinidad and Tobago (NGC), British Gas Trinidad LNG Limited (BG), BP Trinidad and Tobago Company (BP) (formerly known as Amoco Trinidad LNG B.V.), Repsol LNG Port Spain B.V., and Tractebel Trinidad LNG Limited. Atlantic LNG's plant was located in Point Fortin in the southwestern coast of Trinidad and Tobago. Trains 1 and 2 were the only operational trains in 2002. Train 1 partners were BP (34%), BG (26%), Repsol (20%), and NGC and Tractebel (10% each). The plant's designed capacity was 3 Mt/yr of LNG for export and 6,000 bbl/d of stabilized NGL. All feed gas to Train 1 was via a 40-inch offshore pipeline and a 36-inch onshore pipeline from gasfields located off the southeastern coast of Trinidad. The pipeline was owned by NGC and operated by BP. Tractebel had a 20-year agreement to purchase 60% of the production of Train 1; the remaining 40% was purchased by Enagas of Spain. In July, Atlantic LNG began expansion of the plant, which will cost \$1 billion. The expansion consisted of the construction of two additional trains (2 and 3), each of which was designed to produce 3.3 Mt/yr of LNG and between 10,000 and 12,000 bbl/d of NGL. The expansion was expected to increase production to 9 Mt/yr from 3 Mt/yr by 2003. The first shipments from Train 2 were delivered in August 2002. Of the total expansion output, 62% has been committed to the Spanish conventional and power markets, and the remaining 38% is scheduled to be sold to the United States. Trains 2 and 3 partners were BP (42.5%), BG (32.5%), and Repsol (25%). Atlantic LNG proposed to the Government of Trinidad and Tobago the construction of a fourth train and pipeline at a cost of \$1 billion. Train 4 will be located to the south of the company's existing trains and is expected to produce 5.2 Mt/yr of LNG and be completed by 2005 (Atlantic LNG, 2003§).

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OTHER ISLANDS OF THE CARIBBEAN

The mineral industries of the other islands in the Caribbean (Antigua and Barbuda, Aruba, The Bahamas, Bermuda, Dominica, Grenada, Guadeloupe and Martinique, Haiti, Montserrat, the Netherlands Antilles, Saint Kitts and Nevis, Saint Lucia, and Saint Vincent and the Grenadines) are small. Mineral production is mostly limited to construction materials for domestic consumption, cement, and salt. Petroleum refinery products are produced in Aruba, Martinique, and the Netherlands Antilles. For additional coverage of the mineral industries of these islands, see the 2000 and 2001 Minerals Yearbook, Volume III, Area Reports: International, Latin America and Canada.

TABLE 1
ISLANDS OF THE CARIBBEAN: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons unless otherwise specified)

Country and commodity	1998	1999	2000	2001	2002
ARUBA ^{c, 2}					
Petroleum refinery products thousand 42-gallon barrels	65,000	65,000	100,000	100,000	100,000
Sulfur, byproduct of petroleum	50,000	50,000	77,000	77,000	77,000
BAHAMAS, THE ^{c, 3}					
Salt	900,000	900,000	900,000	900,000	900,000
Stone, argonite	1,200,000	1,200,000	1,200,000	1,200,000	1,200,000
BARBADOS ^{3, 4}					
Cement:					
Hydraulic	259,181	252,959	267,659	249,544 ^{r, 5}	297,667 ⁵
Clinker	NA	NA	NA	241,899 ⁵	284,009 ⁵
Clay and shale	120,000	150,000	150,000	132,000 ^{r, 5}	132,000 ⁵
Limestone ^c	1,500,000 ⁶	1,500,000	1,500,000	1,730,000 ^{r, 5}	1,230,000 ⁵
Liquefied petroleum gas ^c 42-gallon barrels	20,000	20,000	20,000	17,587 ^{r, 5}	11,011 ⁵
Natural gas:					
Gross million cubic meters	37	47	38	32 ^{r, 5}	29 ⁵
Marketed ^c do.	15	15	15	16 ^{r, 5}	14 ⁵
Petroleum:					
Crude thousand 42-gallon barrels	585	708	560	464 ^r	391
Refinery products do.	2,277	-- ^r	-- ^r	-- ^r	--
Sand ^c	200,000 ⁶	200,000	200,000	550,000 ^r	500,000
CUBA ^{3, 7}					
Asphalt	68,400	73,300	69,000	70,000 ^e	70,000
Cement, hydraulic ⁸	1,713,400	1,784,600	1,632,700	1,324,100 ⁹	1,326,900 ⁹
Chromite	46,000	52,000	56,300	50,000 ^r	46,000
Cobalt, mine output, Co content: ^{8, 10}					
Oxide, oxide sinter, sulfide, ammonical liquor precipitate	3,135	2,996	3,322	3,910 ¹¹	3,607 ¹¹
Sulfide and ammonical liquor precipitate	2,668	2,537	2,841	3,411 ¹¹	3,124 ¹¹
Copper, mine output, Cu content	1,351	1,090	1,346	1,000 ^e	1,000 ^e
Feldspar	14,400	4,800	6,700	7,000 ^e	7,000 ^e
Gold ^c kilograms	1,000	1,000	1,000	1,000	1,000
Gypsum ^c thousand tons	130	130	130	130	130
Iron and steel, steel, crude	283,327	302,662	327,300	269,600 ⁹	264,100 ⁹
Kaolin clay	11,000	10,400	9,700	10,000 ^e	10,000 ^e
Lime thousand tons	93	92	82	80 ^e	80 ^e
Natural gas, marketed thousand cubic meters	124,200	460,000	574,100	594,600 ⁹	584,700 ⁹
Nickel, Ni content:					
Mine output, oxide, oxide sinter, sulfide, ammonical liquor precipitate	64,605	63,508	67,754	72,619 ¹¹	71,592 ¹¹
Metallurgical products: ¹⁰					
Granular oxide, oxide sinter, powder	38,192	37,510	39,228	40,748 ¹¹	39,516 ¹¹
Sulfide	25,176	24,999	27,288	29,914 ¹¹	30,858 ¹¹
Ammonical liquor	1,237	999	1,238	1,958 ¹¹	1,218 ¹¹
Total	64,605	63,508	67,754	72,620	71,592
Nitrogen, N content of ammonia ^c thousand tons	135	135	135	135	135
Petroleum:					
Crude ¹² thousand 42-gallon barrels	10,823	13,777	17,382	18,609 ⁹	17,995 ¹³
Refinery products do.	60,000	60,000	60,000	60,000	60,000 ^e
Salt	134,600	159,100	177,000	180,000 ^e	180,000 ^e
Sand	1,861,200	1,775,700	1,989,300	2,000,000 ^e	2,000,000 ^e
Silica sand	94,500	91,200	52,400	50,000 ^e	50,000 ^e
Stone, crushed	2,860,000	2,950,300	3,301,300	3,300,000	3,300,000 ^e
Sulfur, byproduct of petroleum ^c	5,000	5,000	5,000	5,000	5,000
Zeolites	41,700	37,000	37,400	37,500 ^e	37,500 ^e

See footnotes at end of table.

TABLE 1--Continued
ISLANDS OF THE CARIBBEAN: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons unless otherwise specified)

Country and commodity	1998	1999	2000	2001	2002
DOMINICAN REPUBLIC¹⁴					
Cement, hydraulic	1,884,562	2,000,000 ^e	2,194,000	2,976,118 ^{r, 15}	3,070,532 ¹⁵
Gold kilograms	1,424	651	--	--	--
Gypsum ¹⁶	80,000	81,249	110,044	175,553 ^{r, 17}	178,941 ¹⁷
Iron and steel:					
Ferroalloys, ferronickel	69,419	85,000	84,900	60,654 ^{r, 16}	59,654 ¹⁶
Steel, crude	35,874	42,893	35,801	32,521 ^{r, 16}	60,956 ¹⁶
Limestone thousand tons	1,000 ^e	605	703	530 ^{r, 17}	429 ¹⁷
Marble ¹⁶ cubic meters	2,687	2,700	4,057	5,420 ^{r, 17}	6,333 ¹⁷
Nickel, Ni content:					
Mine output, laterite ore	40,311	39,997	39,943	39,120 ^{r, 16}	38,859 ¹⁶
Metal, ferronickel:					
Smelter	25,220	24,455	27,829	24,005 ^{r, 16}	23,303 ¹⁶
Shipments	26,554	24,012	27,226	23,411 ^{r, 16}	22,945 ¹⁶
Petroleum refinery products:					
Liquefied petroleum gas thousand 42-gallon barrels	480	433	450 ^e	450 ^e	450 ^e
Gasoline, motor do.	1,877	1,906	1,900 ^e	1,900 ^e	1,900 ^e
Kerosene do.	84	71	90 ^e	90 ^e	90 ^e
Jet fuel do.	1,763	1,788	1,800 ^e	1,800 ^e	1,800 ^e
Distillate fuel oil do.	2,888	2,656	2,700 ^e	2,700 ^e	2,700 ^e
Residual fuel oil do.	4,506	4,408	4,400 ^e	4,400 ^e	4,400 ^e
Total do.	11,598	11,262	11,300 ^e	11,300 ^e	11,300 ^e
Salt:					
Marine ^e	50,000	50,000	50,000	50,000	50,000
Rock	5,672	10,000	162,851 ^{r, p}	189,595 ^{r, p}	29,560 ^p
Total	55,672	60,000	212,851 ^r	239,595 ^r	79,560
Sand and gravel ¹⁵ thousand cubic meters	12,933	15,398	16,246	15,486 ^r	15,977
Silver kilograms	7,409	3,140	--	--	--
GUADELOUPE^{e, 3, 18}					
Cement	230,000	230,000	230,000	230,000	230,000
Limestone	5,000	5,000	5,000	5,000	5,000
Pumice	210,000	210,000	210,000	210,000	210,000
Salt	48,000	50,000	49,000	49,000	49,000
HAITI^{e, 19}					
Cement	--	--	--	203,768 ⁶	290,298 ⁶
Sand and gravel:					
Gravel cubic meters	400,000	427,300 ⁶	450,000	450,000	450,000
Sand do.	2,000,000	2,053,500 ⁶	2,000,000	2,000,000	2,000,000
Stone, marble do.	100	100	131 ⁶	131	131
JAMAICA					
Aluminum: ²⁰					
Bauxite, dry equivalent, gross weight thousand tons	12,646	11,688	11,127	12,370	13,119 ²¹
Alumina do.	3,440	3,570	3,600	3,542 ^{r, 21}	3,631 ²¹
Cement, hydraulic ²⁰	557,991	503,713	521,343	596,247 ^{r, 21}	613,981 ²¹
Clay ²⁰	--	--	--	91	66 ²¹
Gold ²⁰ kilograms	--	--	--	214	328 ²¹
Gypsum ²⁰	154,451	235,900	330,441	320,323	164,880 ²¹
Lead, refined, secondary ²⁰	800 ^e	800 ^e	--	--	--
Lime ²⁰	227,300	226,882	267,215	281,853	255,266 ²¹
Petroleum refinery products thousand 42-gallon barrels	5,142	3,607	3,600	3,600 ^e	3,600 ^e
Salt	15,606	19,090	19,068	19,070	19,000 ^e
Silica sand ²⁰	6,128	9,400	6,700	8,244	9,367 ²¹
Silver kilograms	--	--	--	95	174 ²¹

See footnotes at end of table.

TABLE 1--Continued
ISLANDS OF THE CARIBBEAN: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons unless otherwise specified)

Country and commodity	1998	1999	2000	2001	2002
JAMAICA--Continued					
Stone: ²⁰					
Limestone thousand tons	3,201	3,300	3,420	3,488	3,522 ²¹
Marble, cut and/or polished	750	375	150	150 ²¹	155 ²¹
Marl and fill thousand tons	3,900	4,490	4,720	5,422	5,693 ²¹
Sand and gravel do.	1,839	1,580	2,100	2,205	2,249 ²¹
Shale, for cement	NA	NA	NA	151,277 ²¹	144,205 ²¹
MARTINIQUE ^{c, 3, 18}					
Cement, hydraulic	220,000	220,000	220,000	220,000	220,000
Lime	5,000	5,000	5,000	5,000	5,000
Petroleum refinery products thousand 42-gallon barrels	4,800	4,800	4,800	4,800	4,800
Pumice	130,000	130,000	130,000	130,000	130,000
Salt	200,000	200,000	200,000	200,000	200,000
NETHERLANDS ANTILLES ^{c, 2}					
Petroleum refinery products thousand 42-gallon barrels	78,169 ⁶	80,000	80,000	80,000	80,000
Salt	487,373 ⁶	500,000	500,000	500,000	500,000
Sulfur, byproduct of petroleum	30,000	30,000	30,000	30,000	30,000
SAINT KITTS AND NEVIS					
Sand and gravel	200,000 ^e	211,849	214,700	215,000 ^e	222,700
Stone, crushed	105,000 ^e	105,000	121,266	121,270	130,800
TRINIDAD AND TOBAGO					
Asphalt, natural ²²	18,735 ²³	12,600 ²³	7,467	16,216	16,203
Cement, hydraulic ²²	690,400 ²³	688,400 ²³	742,645	708,146	743,700
Iron and steel: ²⁴					
Direct-reduced iron	1,073,333 ²³	1,379,000 ²³	1,530,000	2,186,382	2,316,300 ²³
Steel, crude	809,270	762,199	753,125	696,111	838,900
Semimanufactures, billets	776,900 ²³	723,900	723,000	668,267	816,900
Lead, refined, secondary ^c	1,600	1,600	1,600	1,600	1,600
Natural gas: ²³					
Gross million cubic meters	10,294	13,240	15,483	16,599 ^r	19,172 ²²
Marketed do.	8,651	11,917	14,170	15,173 ^r	17,777 ²²
Natural gas liquids ²² thousand 42-gallon barrels	5,254	5,753 ²³	6,932	7,521	8,505
Nitrogen, N content of anhydrous ammonia ²²	2,271,300 ²⁵	2,720,300 ²⁵	2,679,669	3,036,307	3,258,619
Petroleum: ²²					
Crude thousand 42-gallon barrels	44,759	45,662 ²³	43,593	41,374	47,684
Refinery products do.	49,019	53,320 ²³	57,533	55,870	53,422
Stone, limestone ²² thousand tons	1,100 ²⁶	1,100 ^{e, 26}	1,815	975	851
Sulfur, byproduct of petroleum ^{c, 27}	15,000	15,000	15,000	15,000	15,000

^cEstimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. ^rRevised. ^pPreliminary. -- Zero.

¹Table includes data available through October 2003.

²In addition to commodities listed, crude construction materials (lime, sand, stone, etc.) may be also produced, but data on production are not available, and information is inadequate to make reliable estimates of output levels.

³In addition to commodities listed, crude construction materials (sand and gravel, etc.) may be also produced, but data on production are not available, and information is inadequate to make reliable estimates of output levels.

⁴Barbados also produced stone, but data on production are not available, and information is inadequate to make reliable estimates of output levels.

⁵Ministry of Energy and Public Utilities of Barbados.

⁶Reported figure.

⁷Cuba also produced marble and stone, but data on production are not available, and information is inadequate to make reliable estimates of output levels.

⁸Source: Anuario Estadístico de Cuba.

⁹Source: Sitio del Gobierno de la República de Cuba, accessed at URL <http://www.cubagob.cu>.

¹⁰The Government of Cuba reports figures of nickel-cobalt content of granular and powder oxide, oxide sinter, and sulfide production. The cobalt content of reported nickel-cobalt production was determined to be 1.16% of granular and powder oxide, 1.21% of oxide sinter, 7.56% of sulfide, and 33% of ammoniacal liquor. The remainder of reported figures would represent the nickel content.

¹¹Sources: Sitio del Gobierno Cubano, accessed at URL <http://www.cubagob.cu>, International Nickel Study Group (INSG), and Sherritt International Corp.

TABLE 1--Continued
ISLANDS OF THE CARIBBEAN: PRODUCTION OF MINERAL COMMODITIES ¹

¹²Production has been converted from metric tons to barrels by using the U.S. Department of Energy's Energy Information Administration's factor of 6.449 barrels per metric ton of crude petroleum.

¹³Source: U.S. Energy Information Administration.

¹⁴In addition to commodities listed, crude construction materials (gravel, stone, etc.) may be also produced, but data on production are not available, and information is inadequate to make reliable estimates of output levels.

¹⁵Source: Banco Central de la República Dominicana.

¹⁶Source: Dirección General de Minería de la República Dominicana.

¹⁷Source: Falconbridge Dominicana C. por A.

¹⁸Guadeloupe and Martinique also produced stone, but data on production are not available, and information is inadequate to make reliable estimates of output levels.

¹⁹In addition to commodities listed, asphalt, lime, and salt may be also produced, but data on production are not available, and information is inadequate to make reliable estimates of output levels.

²⁰Source: Ministry of Mining and Energy of Jamaica.

²¹Source: Ministry of Land and Environment of Jamaica.

²²Source: Ministry of Energy and Energy Industries of Trinidad and Tobago.

²³Source: Central Bank of Trinidad and Tobago Annual Economic Survey.

²⁴Source: Caribbean Ispat Limited.

²⁵Source: International Fertilizer Industry Association.

²⁶Reported, in cubic meters, as blue limestone, 415, and yellow limestone, 616, and in 2001, blue limestone, 481 and yellow limestone, 73 in 2000. low-density limestone conversion factor is 1.76 metric tons per cubic meter.

²⁷Sulfur as a byproduct of natural gas may be produced, but information is inadequate to make reliable estimates of output.